POPULAR MECHANICS

An Illustrated Weekly Review of the Mechanical Press of the World

TELLS YOU HOW TO DO THINGS. WRITTEN SO YOU CAN UNDERSTAND

Vol. 11. No. 2. CHICAGO, JULY 12, 1902. PRICE 5 CENTS.

Oregon, Queen of the Western Seas

250,000 FREE HOMES

NO BLIZZARDS

No Tornadoes

No Thunderstorms

Where Horses, Cattle and Sheep Grow for Nothing and Feed Themselves

Where the Wheat and other Cereal Crops were never known to Fail

Canyon of Wheat in Oregon

...at.

...ditions
...ove all

OREGON, QUEEN OF THE WESTERN SEAS.

Land Where 250,000 Homes Are Now Offered Free May Soon Be a Center of Agriculture and Commerce.

Is San Francisco to be the future metropolis of the world and the state of Oregon one of the most populous and important states of the Union? Such a prediction was once made by a noted English scientist, and recent developments lead many to believe there were good grounds for his theory. It looks as if Portland, Ore., is destined to become the Liverpool of America and all the world is now turning its eyes on Oregon, where the wheat and other cereal crops were never known to fail, as if that state had been but newly discovered. The wonderful commercial importance the western coast has assumed because of the new American possessions in the Pacific seems destined to work a revolution in American commercial affairs. The trade with the Philippine Islands and Hawaii, carried on through Portland and San Francisco, is increasing to enormous proportions. Alaska with its many sources of commerce is hourly growing in importance and our rapidly increasing trade with China is causing many at this time to look to "the land of the setting sun." Some mariners declare Portland, Ore., to have the finest natural harbor in the world and it may be that this is to become the great shipping center in our enormous trade with Alaska, the Pacific islands and the Orient. At

Model Farm.

any rate it is certain that Portland's shipping interests are bound to increase many fold and the prospects for her becoming a rival of San Francisco as an ocean port are not in the least remote.

Oregon's splendid agricultural resources, her rich soil, healthful climate and advantageous location, make this state of first importance to the investor when considering the wonderful changes in conditions brought about by our recent wars, acquisitions and stupendous increase of trade. Knowing of these things it is rather surprising when we noticed a short time ago the glaring announcement:

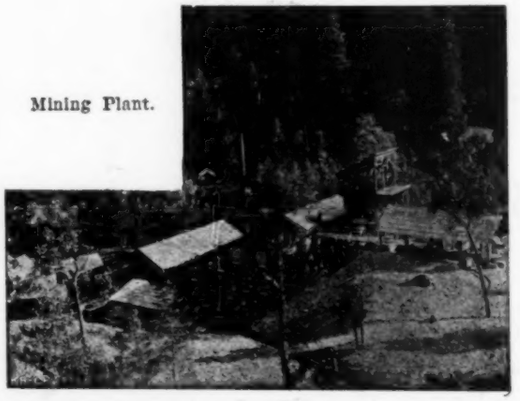
"Two hundred and fifty thousand free homes in Oregon." The announcement is made in good faith, too, and all any one has to do to find out all about them is to write the United States Land Office at either Burns, La Grande, Lake View, Oregon City, Roseburg or The Dalles, Ore. The free homes are of 160 acres each. Besides there are now 490,000 acres of school lands which may be purchased at $1.25 per acre. Information regarding the school lands

A Mountain Home.

be furnished to any one on application to the Clerk of the State Land Board, Salem, Oregon. That these offers will long await acceptance is not very probable in this day when every American is so ready to recognize an opportunity for a good and profitable investment.

NATURE KIND TO OREGON.

"The first shall be last and the last first." Often it has been said and often it has come true. So it is with Oregon; the last of our states to attract any great amount of attention, may soon



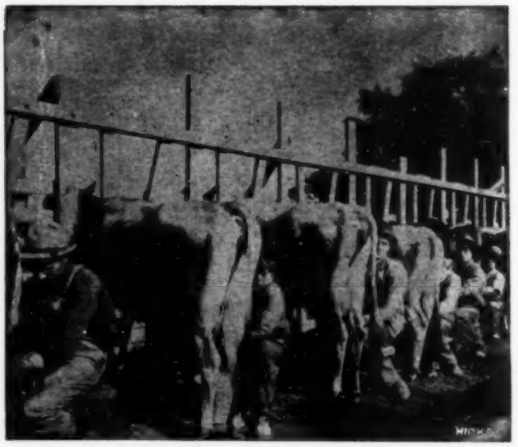
Mining Plant.

become first in commercial importance. It seems that providence has reserved this land of many charms for a certain people and that people is now about to take possession.

To the man in the East who is dissatisfied with the conditions which surround him comes the natural inquiry for that region where conditions may be found that are more promising for his success. The great consideration should be with every man "where can I produce a maximum of results with a reasonable expenditure of effort."

Nature herself when she founded Oregon furnished the answer to this query. It would be difficult indeed to find another section of country with larger or more varied resources than Oregon. Where and how can cheap lands be obtained in Oregon? Need a purchaser reside upon land purchased from the state? What return may one expect from fruit raising? What about wheat and other agricultural products? What of the live stock business? What of lumbering? What transportation facilities does the state have? What of the climate?

These are a few of the questions asked by persons interested in



Milking Time.

changing their homes. The answer to them may be briefly found in the following columns:

WHERE NO STORMS EVER BEAT.

No blizzards. No tornadoes. No thunderstorms. No hot weather in the summer and no cold weather in the winter. There is seldom if ever a day in the year when flannels and light overcoats are not comfortable or a night when heavy blankets are not a necessity. The Pacific Ocean on the west modifies the temperature of the western half of the state, and the Cascade range of mountains, running north and south and dividing the state into natural east and west sections, causes equally great modifications in the climate of the eastern portion of the state.

THE DISTRIBUTION OF RAIN.

Flooded districts and persistent rain, such as have but recently brought devastation to the farmers of the east and central west, are unknown in Oregon.

The distribution of rain in Oregon has many advantages. The soil

J. H. Stewart's Eden Valley Orchard in Oregon.

is sure of becoming thoroughly saturated in the spring, when the crops need rain to start germination and growth. During the summer time occasional showers occur, but at this season of the year they are infrequent, and good crops have been raised without any rain during July and August. The absence of rain during these months insures an abundance of sunshine, and sunshine means the formation of sugar in the juices of plants, thus giving to them a rich flavor unattained in cloudy, damp climates. The infrequency of rains during the summer also enables the farmer to harvest his crops of hay and grain in perfect safety, knowing that after they are cut they can be cured on the ground without danger of being harmed by unwelcome rains.

The annual rainfall of the coast counties in Oregon approximates 100 inches; going from the coast west sixty to seventy-five miles, the annual rainfall ranges from forty-six inches on the north to thirty inches on the south. Crossing the Cascade range of mountains, the eastern section of the state is reached, and here an entirely different climate is to be found. The rainfall in this region varies between twenty inches in the north and eight or ten inches in the south. In the northern tier of counties the rainfall is sufficient for raising good crops of hay, potatoes, garden truck and fruit, and these crops are extensively cultivated in that section. Further south the rainfall is too small for successful farming without the aid of irrigation. Many irrigated farms are to be found in this sub-arid region, but its principal industry is stockraising and mining. This country is well watered by streams rising in the Cascade mountains and their offshoots, and Mr. F. H. Newell, the chief hydrographer of the Interior Department, has recently visited a large part of the district and reports that he found many places that could easily be irrigated by tapping the streams, and also other sections that could be irrigated by means of artesian wells. Large areas in this section of the state will undoubtedly soon be brought under successful cultivation by irrigation methods, as the climate, the soil, and the water supply are all favorable for this purpose.

The healthseeker can find in Oregon almost any temperature desired, ranging from an equability in the coast counties greater than that of England, to such wide extremes as are to be found only in the central portion of continents. There are places near the coast where the mean temperature in July does not differ from that in January by more than 13 degrees. In mid-winter the mean temperature is 45 degrees, and in mid-summer 58 degrees, while in the elevated sections of southeastern Oregon, winter temperatures as low as 20 degrees below zero frequently occur, and in mid-summer it is not uncommon to experience temperatures above the 100 mark. The nights, however, in this section are always cool, and no inconvenience is to be met on account of heat in the daytime.

SOIL IS A LOAM, DARK AND RICH.

In the valleys of Oregon the soil is a loam, dark and rich, with a subsoil of clay. The bottom lands along streams consists of rich deposits of alluvium. "The beaver dam" lands are of this class. As the name indicates, this land has been formed through the work of beavers in years gone by, they having dammed up streams, causing lakes, which were filled with vegetable matter. The water dried and drained away. Settlements encroached upon the seclusion of the beaver and drove him farther to the front. This land is wonderfully fertile and exceedingly valuable.

The soil of the uplands, naturally is less fertile than that of the bottoms and valleys, and is a red, brown and black loam. It produces an excellent quality of natural grass, and under careful cultivation produces good crops of grain, fruit and vegetables.

East of the Cascade mountains the soil is a dark loam of great depth composed of alluvial deposits and decomposed lava, overlying a clay subsoil. The latter rests upon a basaltic foundation, which is so far below the surface as to be visible only on the banks of the deep water courses. The constituents of the soil adapt the land peculiarly to the production of wheat.

In northwestern Oregon, adjacent to the Columbia river, although the dry season continues for months, this light, porous land retains and absorbs enough moisture from the atmosphere, after the particles have been partially disintegrated, to insure perfect development and full harvest.

In southeastern Oregon, notably in the vast areas of fertile land in Malheur and Snake river valleys, the soils are much like those of the northeastern Oregon region, but there is less moisture. Except in a very small portion of this region irrigation is necessary to a successful agriculture. Fortunately the water supply is abundant, and easily applied.

GRAINS.

Oregon affords a vast area of farming lands, the best conditions to warrant the production of heavy crops, and a climate above all

others, enabling the husbandman to work outdoors at something every month of the year. There is but little land in this vast region that is not good for something, being adapted to either wheat, barley, oats, hay, hops, pasture, vegetables, fruits, timber, or mining. In many sections the grass is green the year round. The farmer can seed all the fall until Christmas, or all the spring from February to May. Harvest is continued just as long as the grain will stand.

The average grain yield in Oregon for the past five years is as follows:

Wheat, bushels	25,000,000
Barley and rye, bushels	2,000,000
Oats, bushels	8,000,000
Hay, tons	2,000,000
Potatoes, bushels	6,000,000
Hops	64,340 bales of 180 pounds each

FRUITS.

Oregon fruits and the adaptability of the state for raising them are so well known they need no introduction. Thanks to the constant care and scientific treatment the trees and vines are receiving, the quality of the fruit is ever improving and in the same ratio does the demand for them increase.

Following is the income on fruit in the state for 1901:

	Value.
Apples, 850,000 boxes	$ 750,000
Evaporated apples, 150,000 lbs.	90,000
Evaporated prunes, 22,000,000 lbs.	700,000
Prunes, fresh, 100 cars	50,000
Pears, 100,000 boxes	50,000
Pears, evaporated	10,000
Peaches, 240,000 boxes	100,000
Peaches, evaporated	15,000
Cherries, 5,000,000 lbs.	180,000
Strawberries, 175,000 crates	210,000
Grapes, blackberries and raspberries, crates	150,000
Total	$2,375,000

The state also had the honor of carrying off the highest prize within the gift of North America, the Wilder Medal, which was awarded it at the Pan-American Exposition.

There were also 18 gold medals, 18 silver medals, 51 bronze and 22 honorable mentions awarded individuals in this state, whose fruit was exhibited at the Pan-American Exposition.

The following estimate of the cost of a prune orchard is made by James R. Shepard, of Zena, Oregon:

I estimate the cost of ten acres planted in prunes, twenty feet apart, under ordinary conditions, as follows:

Debit.

One thousand one hundred yearling trees (one hundred and ten per acre) at 6 cents	$ 66.00
Preparation of land (plowing and cultivation)	20.00
Setting out one thousand one hundred trees (at 1 cent each)	11.00
Cultivation and care first year	
Cultivation and care second year	
Cultivation and care third year (no other crop)	30.00
Cultivation and care fourth, fifth, sixth and seventh years	120.00
	$ 247.00

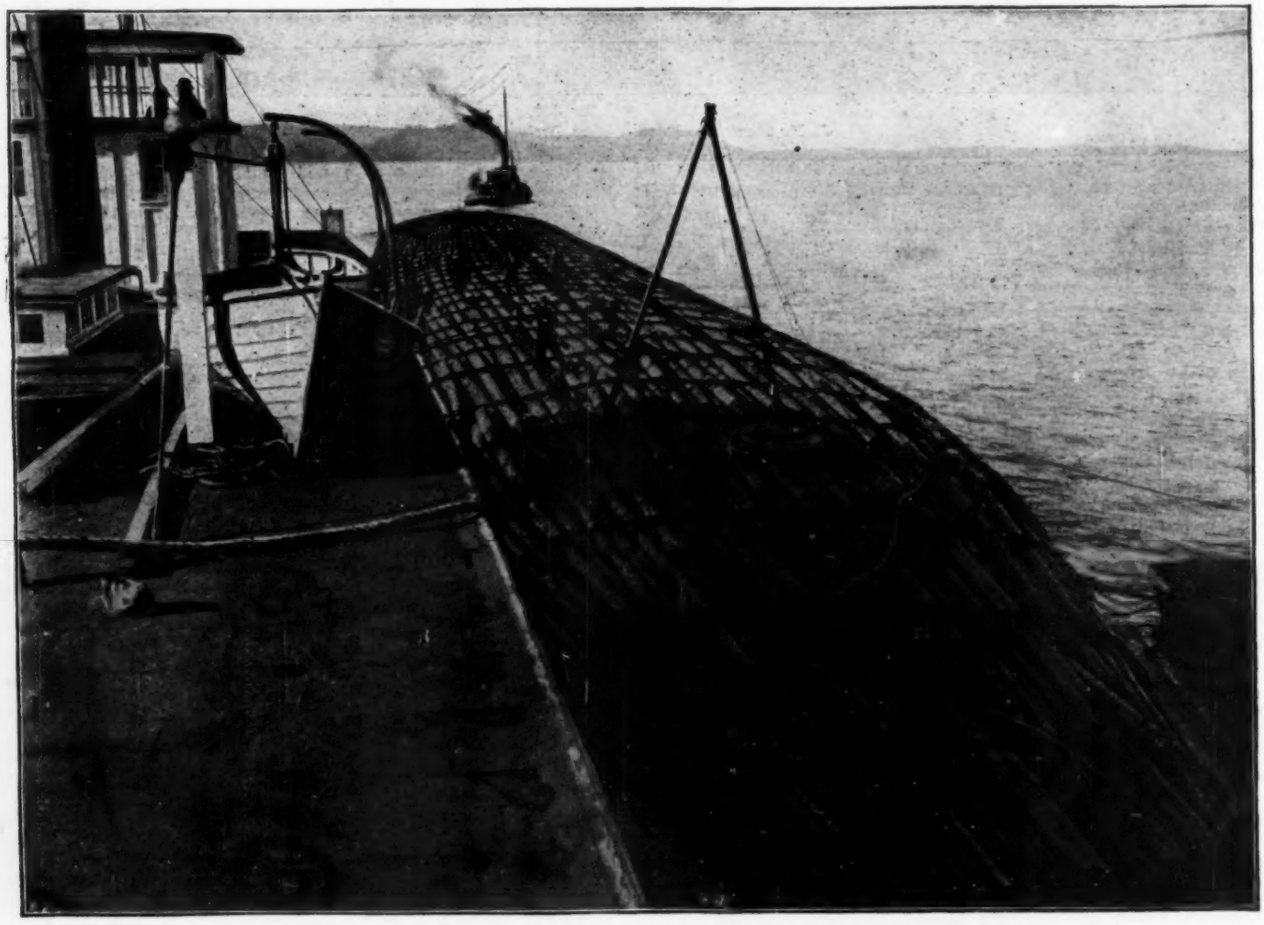
Credit.

Fourth year, one-third bushel of prunes per tree at 60 cents per bushels, 20x1100	220.00
Fifth year, one-half bushel of prunes per tree at 60 cents per bushel, 30x1100	330.00
Sixth year, count a failure of crop	
Seventh year, one bushel of prunes per tree, dried	1,100.00
	$1,650.00

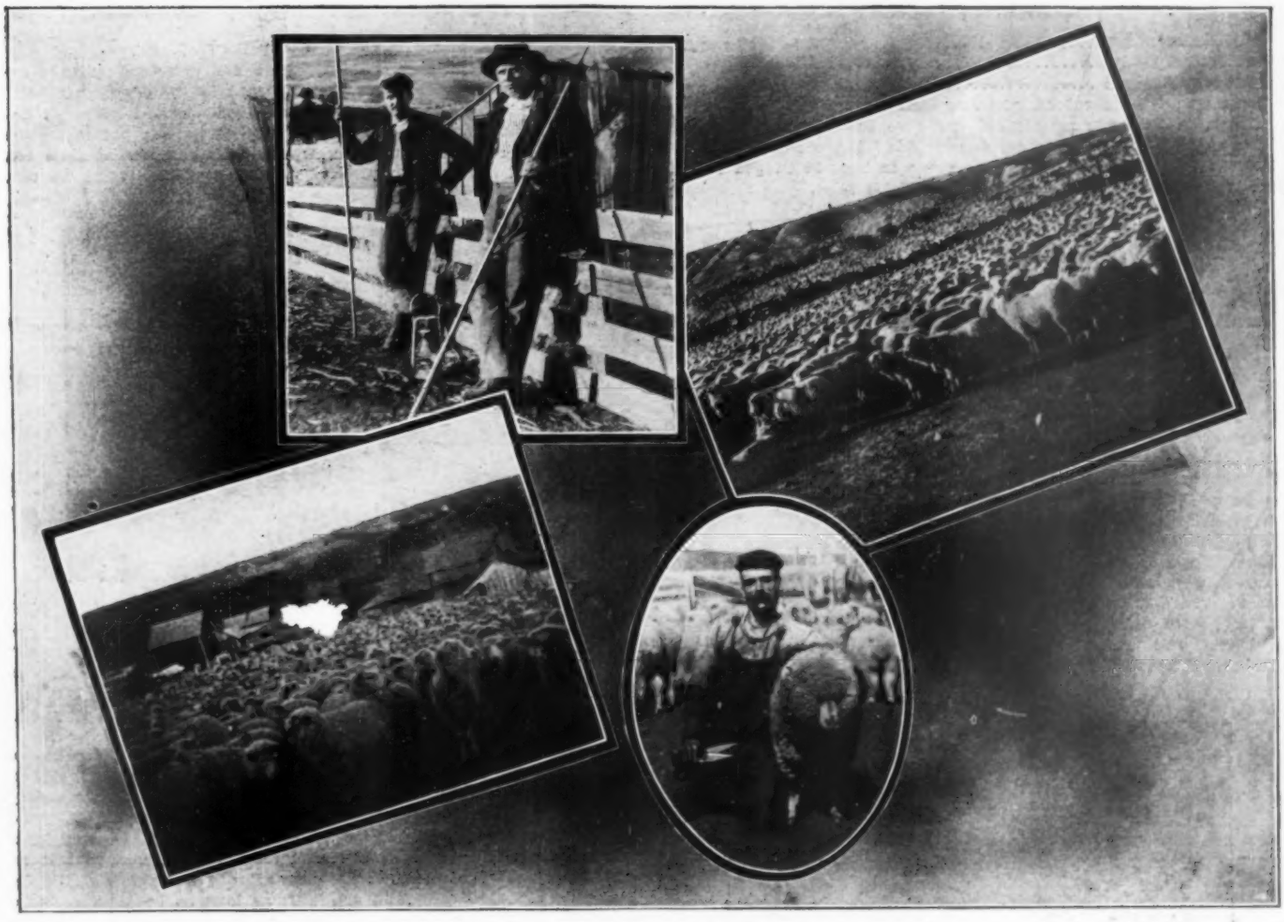
In some instances these figures will be doubled, in others reduced. It will be observed my estimates are very conservative, and no one need do worse, provided he uses ordinary care and judgment; but very much depends on location, soil, etc. I think a net profit (after seven years of age) of $100 per acre is not at all an extravagant estimate at present prices, say 5 to 6 cents per pound.

An occasional off year must be reckoned on, say one in four for Italian, and one in eight for Petite. Estimates of $300 to $500 per acre are misleading, I think, though much better has occasionally been done under high prices and favorable conditions.

My estimate presupposes proper pruning. Where land is well cultivated, but no pruning is done, a bushel per tree the fourth year



A Log Raft, containing 6,000,000 feet, in tow from the Columbia River to California.



G. A. Young's Sheep Ranch near Shaniko, Ore.

may be realized, but the tree is injured thereby.

Estimates on orchards of apples, peaches, pears, cherries, strawberries, grapes, blackberries, raspberries, etc., made by persons experienced in growing them in Oregon, make an equally good showing.

STOCKRAISING.

A Stockman's Elysium—Where Horses, Cattle and Sheep "Grow for Nothing and Board Themselves."

Oregon has been for years the great cattle center of the Pacific northwest. It is also noted for its production of horses and sheep. The mild winter climate, the fact that native grasses remain green during most of the year, and the ease with which the cultivated grasses can be raised, make Oregon an excellent country for every kind of stock. The general practice of western Oregon farmers is to provide fodder for only a part of the year, during the balance of which the stock roam at large, while in eastern Oregon vast numbers never tasted prepared food. Bunch grass furnishes all the elements of nutriment necessary for bone, muscle and flesh. It is as strong as oats or barley, and in its perfection will supply the animal with as much nourishment in a day as the quantity of timothy, clover, or hay it may eat in the same time, with the usual amount of grain added. It makes excellent hay when cured and yields heavily. The stock ranges of Baker, Malheur, and Grant counties are among the best in the west. Cattle have grazed in some of these valleys for more than 20 years without other food than that obtained by them on the ranges, and have never suffered serious loss. Running water is abundant in the streams fed constantly by living springs and melting snow of the mountains; hence, stock does not suffer for lack of water during the driest season. The largest owners of horned stock are improving the quality by infusing fine blood into the herds.

SHEEP HUSBANDRY IN OREGON.

Statistics prepared show the number of sheep in Oregon average per year 3,000,000. The sheep being worth at a very reasonable estimate $2.25 per head, making the total value of Oregon sheep $6,750,000. The Oregon wool clip will average per year 20,000,000 pounds. The wool is worth on an average of 12 cents per pound throughout the state, making the total value $2,400,000.

THE WORLD'S GREATEST TIMBER BELT.

The greatest timber belt in the world is in the counties of Clatsop, Washington, Columbia and Tillamook in northwestern Oregon. In the four counties there are 1,884,900 acres, containing 56,149,200,000 feet of timber This standing timber is worth $40,000,000. Manufactured into rough lumber it is worth about $500,000,000. The principal rivers in the timber belt are the Nehalem, the Wilson and the Trask. Along the Nehalem are 570,300 acres; along the Wilson are 116,640 acres; along the Trask are 102,400 acres. The timber in the belt consists of fir, cedar, hemlock, spruce and larch.

FLAX AS A CROP.

Among the resources of Oregon the production of flax fiber promises to become an important feature. The conditions of soil, climate and water combine in offering great inducements to flax farmers. The mild equable spring weather usually forces the bloom from early flowering plants both wild and cultivated, by the fifteenth of February. The ground well stored with water from the winter rains, is, if fall plowed, then in condition for putting in order for a flax crop, which can ordinarily be sowed by the middle of March or the first of April. No violent storms of rain and hail meet the growing crop and pelt it back into the earth. As the season advances warm sunshiny days, often showery, but with glints of sunlight behind the clouds, give just the moisture the growing crop prefers. In ninety days from time of planting, the crop is ready for the pulling, which brings the work of harvesting at the last of June—just in time to be out of the way of crops requiring attention.

The percentage of fiber to straw is unusual. It has run 35 pounds to the 100 in well retted straw. Oregon straw can be depended on to make 24 to the 100, and to give a strong, elastic fiber well suited to thread making and warp yarn spinning. Thousands of acres of the finest flax land the world can offer is waiting for occupancy.

BEST AND CHEAPEST HOPS.

The climate and soil of Oregon make it possible to grow a better grade of hops than can be produced elsewhere, and at a less cost per pound. In two of the western counties of the state the hop now is the greatest revenue producer. It is a very rapid grower, the vine sometimes shooting upward twelve inches in a day.

The cost of land suitable for hop-growing varies with the character

of the land, distance from market, etc. Average prices may be stated as follows:

Overflow bottom land.....$75 to $100 per acre
Other bottom land ..... 50 to 70 per acre
Prairie and hill land ..... 25 to 40 per acre

These prices are for land that has been cleared and placed under cultivation. The maximum yield per acre in Oregon is generally placed at 2,000 pounds. The average yield is 1,200, which is the usual yield the majority of years. The acreage in hops in Oregon for the year 1901 was 17,500, and same produced 66,000 bales.

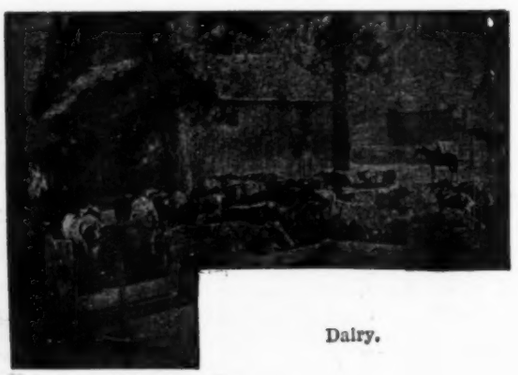
FERTILE WATERS.

The Home of the Royal Chinook, Where Fishermen's Biggest Lies Become Simple Everyday Truths.

Not only the lands, but the waters of this marvelous region are fertile. The waters of Oregon are alive with fish, shelled and unshelled. Along the Pacific coast cod, halibut, herring, sturgeon, sole, shad and smelt abound, while oysters, clams, crabs and lobsters are plentiful. The streams swarm with trout of six or eight varieties, all speckled, and gamey and delicious and the lakes with perch, lake trout and land-locked salmon. The Columbia river and its tributaries are the chosen and only home of the king of all food fishes, the Royal Chinook Salmon. It is found in perfection nowhere else. The product of the fisheries of Oregon for last year amounted to about $3,500,000 and if the north shore is included, much of which is tributary to Oregon, the total output was about $5,000,000.

MORE ABOUT OREGON LANDS.

A final word with regard to Oregon lands. In addition to the government lands referred to above, there are also tracts of land which have been heretofore sold by the state but upon which



Dairy.

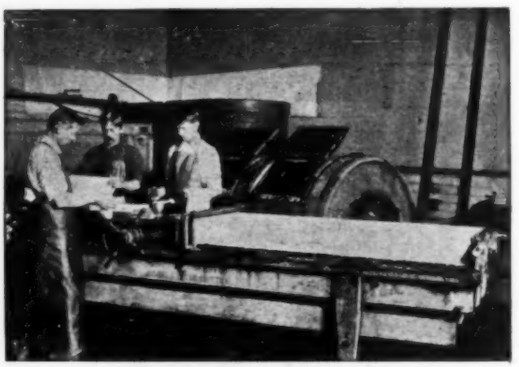
purchasers have permitted their payments of principal or interest to become delinquent. Under the statutes, whenever a purchaser becomes delinquent a year in the payment of either principal or interest, the certificate of sale issued to him becomes void, and a resale may be made to any person who may apply for the land. In such case the first certificate of sale is canceled and a new certificate is issued to the subsequent purchaser, as though the first sale had not been made. So far as the law provides, no contest is necessary in order to oust the delinquent purchaser. These lands cannot well be enumerated, for delinquents may pay up at any time before their certificates are canceled, and other purchasers are becoming delinquent as their payments become due and are not met within the year allowed. Lands of this class are sold at no less than the same price at which they were sold the first time, which price varies from $1.25 to $2 and $2.50, as the special case may be.

HOW LANDS ARE OBTAINED.

The power and duty of selling the school lands is vested in the State Land Board, composed of the governor, secretary of state and state treasurer. All deeds are issued by authority of this board, but the actual business, the negotiations, filing of applications, receiving payments, etc., are performed by the clerk of the State Land Board at Salem, Oregon, to whom all inquiries, applications, etc., should be addressed. Upon request, blank applications will be furnished to intending purchasers. The application, setting forth the description of the tract of land wanted, should be filed with the clerk of the board, together with a remittance of one-fifth of the purchase price. The balance is payable, one-fifth at the end of one year, one-fifth in two years and the remaining two-fifths upon demand by the board, deferred payments drawing 8, 7 and 6 per cent interest, respectively. The maximum amount of land that may be sold to one person is 320 acres. No residence on the land is required, and a man and wife may each purchase a half-section, so that by that means the two could secure 640 acres in one tract. The first payment on a section of land would be $160.

QUALIFICATIONS OF PURCHASERS.

The law requires that the application for purchase must be accompanied by the affidavit of the applicant to the effect that he is above 18 years of age, and is a citizen of the United States or has declared his intention to become such; that he has not made any previous purchase of state land, which, with the land applied for, would exceed 320 acres; that the proposed purchase is for his own



Cutting and Wrapping Butter.

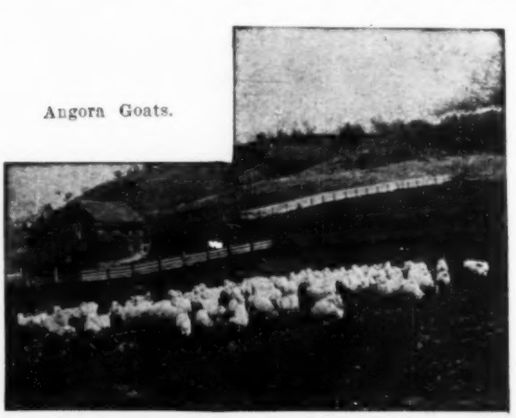
benefit, and not for the purpose of speculation; that he has made no contract or agreement, express or implied, for the sale or disposition of the land applied for in case he be permitted to purchase the same, and that there is no valid adverse claim thereto by any actual settler.

The requirements are as liberal as are ever extended to purchasers of public land, and for this reason many school sections have been secured by speculators through the mediumship of persons who apply for the land with the intention of conveying it immediately. The conditions are just as liberal for the bona fide settler, however, for a purchaser need not live on the land all the time, nor visit it at stated periods. He need not "prove up," can transfer his title by assigning his certificate, and can wait as long as he wishes before taking a deed from the state. As long as a purchaser holds the certificate of sale, his title is good, even though he have no transfer from the state on the records.

CHARACTER OF THE LAND.

As a general rule it may be said that if land is worth anything at all, it is worth $1.25 per acre.

There was a time, and not many years ago, when the great plains west of the Mississippi were called a desert and were considered "not worth anything." No one would have paid $1.25 per acre for that land then, though it has since proved to be worth $15 to $20 per acre. There are lands more or less timbered and possessing a wonderfully productive soil. The timbered lands now for sale at $1.25 per acre,



Angora Goats.

are inaccessible—that is they are so far back in the hills that under present conditions, it will not pay to log the timber. Not many years hence this will be changed, and saw-mills will be seeking the timber now thought inaccessible, just as they are now sawing up the timber that nobody wanted ten years ago. The coast country is ideal for dairying. Rains fall at nearly all seasons and grass is green all summer. The higher up one goes in the mountains, the longer the grass remains green in summer. Within twenty miles of the summit of the Cascades cattle can be fed the year round with but little feed

except what they pick. East of the Cascade mountains the land is supposed to be valuable chiefly for pasturing, though each succeeding year thousands of acres are added to the cultivated areas. Eastern Oregon is expected to see a very rapid development in the next five years, and during that time more than half the school sections now for sale in that part of the state will be disposed of. Southern Oregon is also undergoing rapid settlement and may be considered a good field for investment in cheap land.

The home-maker must first determine to what part of the state he wishes to go to make a home. If he wants land at $1.25 an acre, he must go back from the thickly settled regions, though not out of the reach of the mails. Having decided where he would probably care to live, he should write to the State Land Office at Salem, if he

An Oregon Log Flume.

wants school land, and inquire what lands are for sale in that locality. He must specify the locality with some degree of definiteness.

TRANSPORTATION.

Ocean ships from all parts of the world enter Portland harbor, the fresh water of which so cleans their bottoms that vessels from the Columbia river make better time across the seas than do those from any salt-water port.

The Union Pacific railroad, the great commercial artery through which flows the life blood of the North Pacific coast, is preparing to make extensive additions to its Oregon lines, which will be another important factor in the state's advancement. So great has been the demand for Oregon lands and so numerous the inquiries concerning them from all sections of America, that the Union Pacific company has found it necessary to open up central emigration offices in Chicago for the accommodation of traffic to this new land and for the purpose of answering inquiries concerning the country's resources. The offices are at 238 Clark street, and G. M. McKinney, immigration agent of the Union Pacific company, is in charge. To him we are indebted for much of the information contained in this article and all those desirous of learning more of this young western state, will find Mr. McKinney ready to give them much valuable assistance.

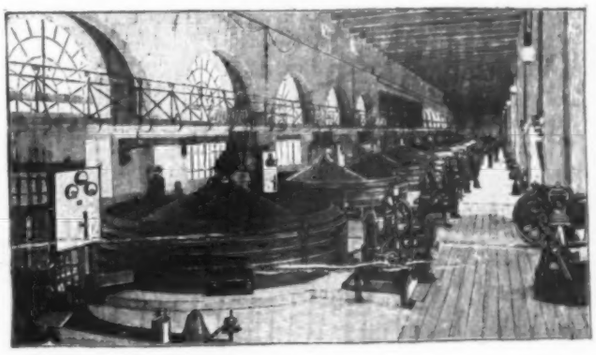
WILL SWEEP FLOORS WITH AIR.

Air instead of brooms will remove the dust and dirt from the mammoth store building now being erected in New York City for R. H. Macy & Co. With the new system one man will sweep a floor in a few minutes and not make any dust, either. A system of pipes similar to water pipes extends through the building. On each floor at frequent intervals are places to attach a hose. At the end of each hose is a piece of pipe made T shape with holes in the bottom end of the T. In the basement are two big iron tanks with sprays of water. Big air pumps draw the air out of the tanks, creating a vacuum, and the "sweeper" has only to run his line of hose with the sucker along the floor and the dirt disappears like magic. The tanks are cleaned out each day.

Virginia is rapidly becoming the greatest shipbuilding state. In ten years $15,000,000 has been spent for shipyards.

INTERESTING ELECTRIC PLANT IN FRANCE.

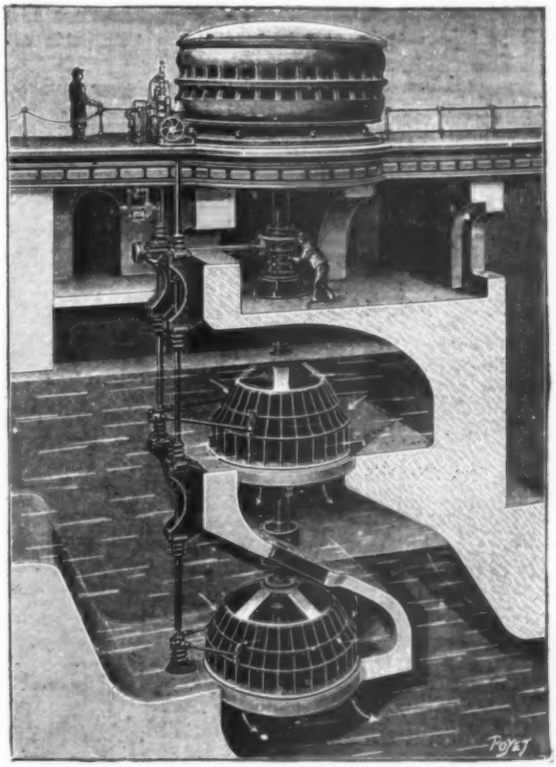
On the river Rhone, near the thriving village of Vernier, France, is in operation one of the most complete water-power electric plants in the world. Its construction, which was commenced in 1893, occupied seven years. A massive dam of heavy



Nine Big Generators.

stone masonry affords a fall of 40 feet and the supply of water is constant throughout the year, the river taking its source as the outlet of Lake Geneva, Switzerland. The melting snows of the Alps afford a never failing supply.

In the station are nine generators, each driven by two turbines, one below the other on the same shaft. In front of each



Wheel Pit.

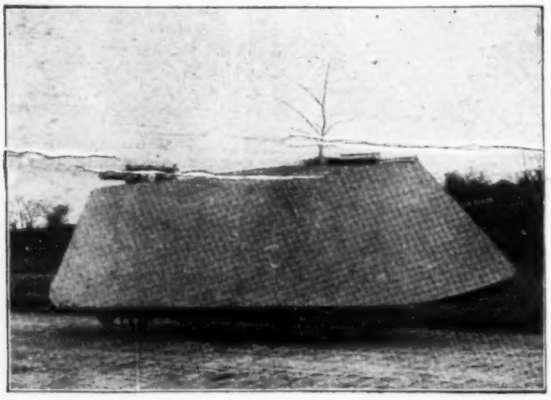
generator may be seen its water governor, and further to the right are the controlling gates, which admit and stop the flow of water to the turbines. As shown in the cut, each turbine has its own independent water supply and discharge, and either turbine, or both, of the pair may be operated as desired.

The plumbing contractor on a big business block in New York is using a pipe cutter and threader which works up to 8-inch pipe, and is driven by electric motor. It is set up in the basement, and is saving hundreds of dollars and lots of time.

A FORTRESS ON WHEELS.

Strange Vehicle Built in England.

This movable fort is the invention of F. R. Simms, an Englishman, and one has just been completed. It is designed for coast or road defense and is also adapted to riot work. In coast defense it can be rushed to a danger point which may be otherwise unprotected. The splendid highways of England permit of



Simm's Motor War Car.

the rapid movement of even so large and heavy a machine. Power is furnished by a hydro-carbon engine capable of 1,000 revolutions per minute.

The motor war car can also be used to haul supplies and guns. The car carries two pieces, one at each end, which can be swung around to any range desired. Our illustration is from the London Engineering Times.

FIRST AMERICAN MILL IN CALIFORNIA.

The first flour mill built in California by an American was erected at Altruria, in 1849 by Mark West. It was a huge

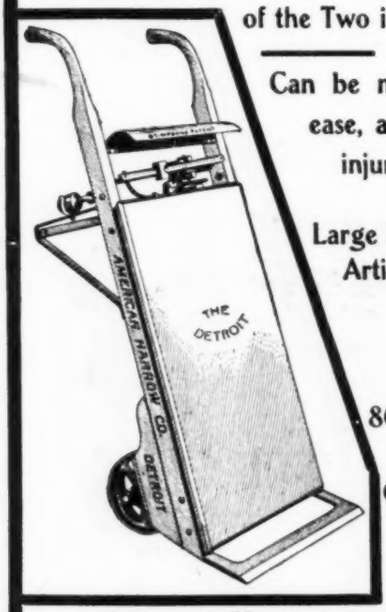
The Oldest Mill.

undershot wheel and stood until 1898 when it was burned. Our illustration is from the American Miller.

Tests in Germany show large loss of power in a fly-wheel due to the friction of the air. In one instance the covering of the wheel with a metal jacket showed a saving of nearly 20 per cent.

DETROIT TRUCK SCALE

More Convenient and Useful than a Separate Scale and Truck, because of the combination of the Two in One.



Can be moved about with ease, and no danger in injuring the scale.

Large Platform for Bulky Articles, or for Crate for Stock.

Capacity 800 or 1000 pounds.

Our booklet gives complete information.

Let us tell you more about it

AMERICAN HARROW CO.

DETROIT, MICHIGAN.

Write for my Daily Market Letter

Geo. H. Phillips

Commission Merchant

Grain, Provisions and Seeds

Consignments Solicited

231-235 Rialto Building, CHICAGO

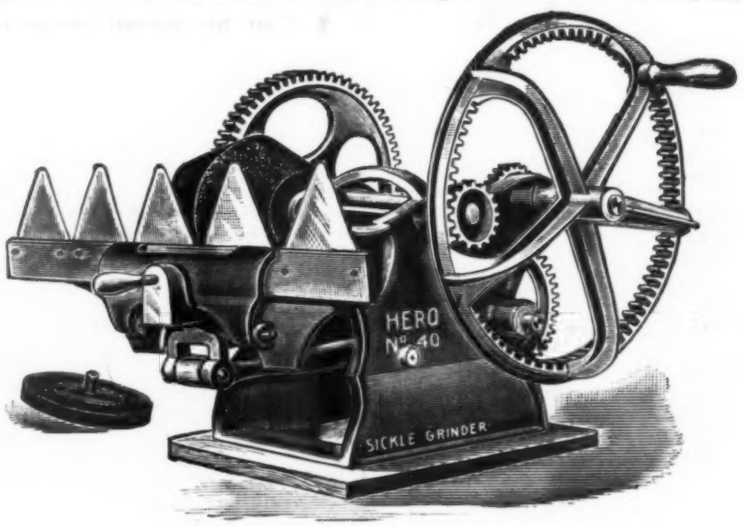
Orders for future delivery executed on margins. All business transacted through and confirmed by IRWIN GREEN & CO.

My daily and weekly market letters are published in full in the Chicago Evening Post, also the Chicago Evening Journal. Will send either paper, free of charge, to anyone interested in the market.

A GRINDER FOR FARMERS AND MECHANICS.

New Hand and Foot Power Machines That Are Attracting World-Wide Attention.

A line of hand and foot power emery grinders attracting considerable attention throughout the world, are those known as the Hero Brand, which are manufactured by the Robertson Mfg. Co., Utica St., Buffalo, N. Y.



"No. 40"—Sickle Grinder.

The management of the company have given this line a very careful mechanical study with the main object of producing a line of practical grinding machines and having the motto, "quality first and always."

The No. 10 Hero is a foot power machine having many new features above the ordinary and designed particularly for the requirements of machinists, blacksmiths, repair men, etc.

No. 20 is a bench grinder, having several attachments for special work, one in particular for carpenters', carriage makers' and wood workers' tools, insuring the most perfect grinding of their tools.

No. 30 Hero is a power machine, having the same attachments as No. 20 for chisel and plane iron grinding.

No. 40 is a machine designed to attain general popularity, not only with the farmers, but mechanics also. The engraving here presented shows Hero No. 40 with a section knife in position for sharpening, also the extra wheel which is furnished with the machine for tool grinding, etc., which makes this tool more valuable to the farmer, as at all seasons of the year grinding is required and as emery grinding is rapidly displacing the old grindstone method. After once using this machine farmers will wonder how they ever got along without it. It weighs 21½ lbs. Being all combined, it may be taken to the field in case of accident to section knives. The wheels are of the best Turkish emery of standard pattern. The very best iron and steel to be obtained are employed in its construction. It has a speed of three to five thousand revolutions.

The Metal Worker says: The knife holder is mounted on an oscillating arm having a reciprocating motion. The holder is hinged on the end of the arm, and has a suitable clamp screw with a handle for controlling the pressure of the knife to the wheel. It is also provided with a stop device at any point of contact, so that in case the knife has been broken at any place it may be ground out, thus avoiding grinding down the entire surface of the edge to sharpen the broken part. The motion of the arm can also be changed instantly from a stationary to a full stroke, or vice versa. The machine is provided with a screw adjustment to prevent the points of knives being ground off, allowing only sufficient contact with the abrasive to insure perfect grinding. Saw gumming and sharpening wheels can be mounted on this arbor.

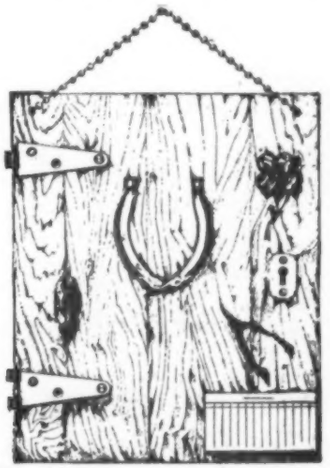
IMPROVED IRONING BOARDS.

This is a woman's invention. An extension frame, which may be readjusted as desired, supports an apron which prevents the article being ironed from touching the floor.

A Woman's Idea.

LATEST CALENDAR DESIGN.

The cut shows the latest patent for a calendar design. It is made in imitation of a barn door, but to be complete should also have a bunch of seed corn ears, and at least one gopher skin tacked on.



Calendar Design.

GATHERING OLD CORKS A NEW INDUSTRY.

Growing Scarcity of the Useful Bark Causes a Necessary Economy.

The person who invents a substitute for cork will make a fortune. Cork, which is the bark of a tree that grows principally in Spain and Portugal, is becoming exceedingly scarce and high priced. In the absence of any proper substitute a new industry—the gathering, cleaning and revamping of old corks—has grown up in our midst. Champagne corks are the finest and most valuable and rarely are they thrown away. The Grocers' Criterion says:

"In the big hotels, restaurants and saloons, the cork perquisiste is now a modestly valuable privilege. The corks are no longer cast contemptuously by, but are thrown into a box or cask, where they accumulate until the cork picker arrives. He pays a round sum in cash for all offered to him. The average waiter and bartender now employs corkscrews that inflict minimum damages upon the cork, and in places where many bottles are opened in the course of a day, a steel cork extractor is used which will pull out a cork from the interior of a bottle into which it has been carelessly forced.

The steam yacht Safa-El-Bahr, built in Glasgow for the Khedive of Egypt and bought by Col. Francis L. Leland, has been chartered for the season by C. M. Schwab. The boat is schooner rigged and its dimensions are 221 feet in length, 27 feet beam and 15 feet deep.

HIS INVENTIONS PAY.

Little Useful Things That Add to Public Convenience and Amusement.

The proverbial "hard life" of the inventor, so long a subject of jokes and cynicism, is not what it used to be. A Chicago photographer who patented a few useful trinkets a short time ago has found the vocation so remunerative that he now con-

Detached and folded, 10 inches long.

Attached to Tripod, makes it strong.

templates giving up his extensive photograph business and devoting his time entirely to inventing and the manufacture and sale of his new devices. This man is George E. Mellen. He has now organized the Mellen Manufacturing company, which has offices in the Times Building, 96 Fifth avenue.

All of Mr. Mellen's inventions are little

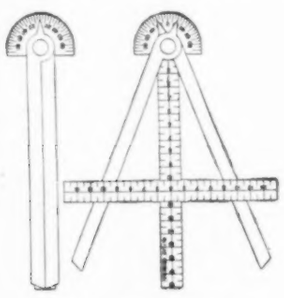
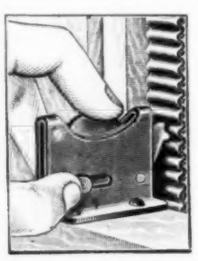


Photo View Finder.

things. He says he finds them the greatest money makers. A few of his latest and most successful contrivances we illustrate in the accompanying article. The first is a photo-tripod stay which holds the tripod



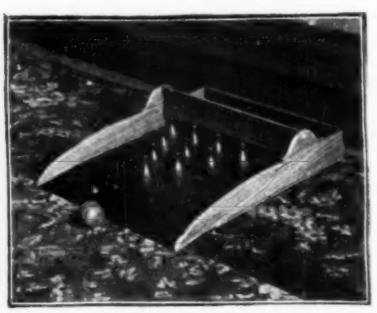
Unlocking Window.

as firm as if gripped in iron vices. This is truly the missing link to the spraddling photographic tripod. With its use there is no more need of accidents from the slipping of tripod legs, or from the swing of a blundersome foot.

The next illustration is a photo view finder—a hand vest pocket adjustable device for giving the exact limit of view for any lens or plate.

With the ventilating sash lock, shown herewith, mothers need never worry through fear of their babies' falling from an open window or of bold burglars' breaking into their homes. This device will lock both sashes when the window is open or shut and it is impossible to push either sash up or down until it is unlocked. It fastens on top of the lower sash and may be attached by any one.

Mr. Mellen's "parlor bowling" is one of the most unique conceptions of the day from an amusement standpoint. It is especially interesting to young people, but affords plenty of fun for adults. It is a new device for playing the popular game



Parlor Bowling.

of bowling at one's own home. Its special feature is the swinging gate which allows the ball to pass under into the pit and prevents it from rebounding against the standing pins or from rolling all over the floor. Once the ball has passed the little gate or partition it rests securely in the space behind it. The box is to be laid flat upon the carpet, floor or ground and the player makes the roll, standing on a low box or stool, from a distance of 10 or 15 feet.

EDISON TALKS OF FAST AUTOS.

Thomas A. Edison recently took a wild cross-country ride in a big gasoline automobile with E. E. Briton of the Automobile Club of America. He said:

"I never rode so fast in my life. We speeded up and down the avenue so rapidly that all I saw was a streak of trees. During the ride I learned several important points. I have drawn plans to work them out, but I cannot make them public.

"I can make an electric automobile that will go so fast a man cannot sit in it. The speed of storage battery machines is unlimited. I am no sport and do not care to ride fast, so I don't think I'll ever make such a machine. It is a simple matter and all depends on how fast a man can ride and live."

MAKE GOATS PACK THE DAMS.

A writer for the Mining and Scientific Press has committed the following:

"In India engineers build a good many earth dams, and they do very well, when the earth is well packed. They pack them by having a herd of sheep or goats on one slope of the dam while they are filling about 4 inches or so on the other slope. They put feed boxes on each end of the dam, and whenever goats see a goat eating anything anywhere they think he has something good and rush for it, so that several hundred goats keep capering back and forth and thus pack the dam in a very cheap and effective way."

NEARLY KILLED, BUT CURED HIS RHEUMATISM.

An English gentleman, a Mr. Darke, over 80 years of age, fell upon the third rail conducting the electric current on the City & South London Ry. He says: "In attempting to rise I grasped the conductor rail and received some 400 volts of electricity. The sensation was that of a cannon ball rushing through me from head to foot, and as I lost consciousness I felt death inevitable. * * * I was lifted to the platform, had my wounds dressed, and am now entirely free from rheumatism, to which I was before subject."

Japan is the largest consumer of rice in the world, the average being 300 pounds a person per year. Americans use about four pounds per capita.

ELLIOTT
ADDRESSING MACHINE
A PERFECT addressing system, makes 2,000 different addresses per hour, always legible. Addresses envelopes, any size, wrappers, statements, shipping tags, gas and telephone bills, pay envelopes, etc. Send for catalogue N.
The Elliott Addressing Machine Co.
100 Purchase Street, Boston
48 Dearborn Street, Chicago
516 Holland Building, St. Louis
309 Broadway, New York
1138 R. E. Trust Bldg., Philadelphia
Mention Popular Mechanics.

SECOND HAND
DYNAMOS AND MOTORS
We carry a large stock of high grade second hand dynamos and motors for all purposes, and fully guarantee every machine we sell. We are equipped to promptly rewind any make of machine, and solicit your correspondence if you wish to buy or sell.
Guarantee Electric Company
133 to 139 S. Clinton St.
CHICAGO
CHAS. E. GREGORY, President

A Wonderful River and Sea-Going Boat

Invention of a Well-Known Steam Boatman that Promises to Revolutionize River and Gulf Coast Traffic

Capt. Geo. O. Rogers, a life-long boatman on the Mississippi River and for many years with the St. Louis & Mississippi Valley Transportation Company, has resigned and patented a steam-boat which, in the opinion of experts, will revolutionize river and gulf coast traffic. The following is a brief description of this boat:

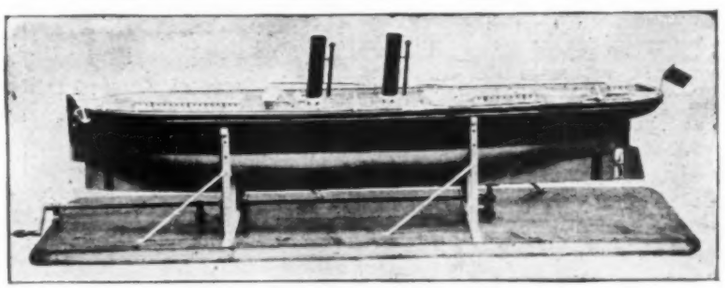


Fig. 1—Inner Hull Lowered.

The vessel is really a vessel within a vessel, for it is composed of two hulls, one set within the other, and entirely independent of each other. The inner hull is a complete ship in itself and naturally very long in proportion to its beam. It will contain the ship's engines, quarters for the crew, and room for miscellaneous cargo.

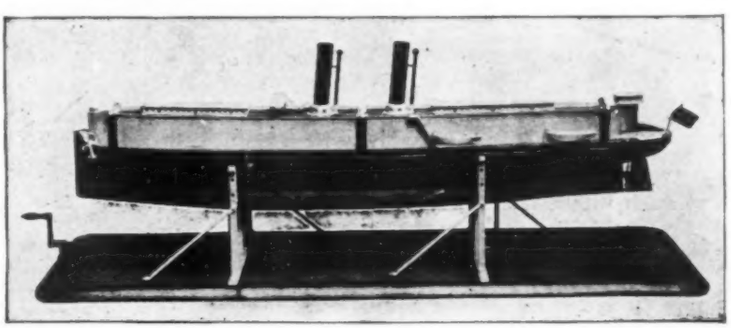


Fig. 2—Inner Hull Raised.

The outer hull will be used exclusively for carrying cargo. The object of the two hulls is to enable the boat to navigate both deep and shallow water by raising and lowering the inner hull. When in deep waters the inner hull will be lowered thus giving the boat stability enough to withstand the ocean currents. On entering shallow water the inner hull will be raised enabling it to navigate wherever the depth of water is not less than four feet. The raising and lowering of the inner hull is accomplished by means of hydraulic cylinders secured to the outer hull, with rams attached to the inner one. When the inner hull is raised the bottoms of the two hulls will be parallel, and, owing to the great beam of the boat, the boat will draw only four feet of water. When the hull is lowered it will draw about 12 to 14 feet. No effort will be made to secure great speed, the object being to combine large carrying capacity with great steadiness and stability.

Cut No. 1 shows this boat with the inner hull lowered, drawing its full draft. Cut No. 2 shows this boat with the inner hull raised enabling it to go in shallow water.

The patent for this boat is owned by the St. Louis & Beaumont Transportation Company, a corporation chartered under the laws of Arizona. This corporation will build a line of boats for traffic on the Mississippi River and to the Gulf ports, designed particularly for the transportation of oil, and it would seem that the possibilities of this company are almost incredible. In fact, it is likely to almost inaugurate a revolution in the freight carrying trade of the world.

We are informed that a small block of this stock will soon be offered to investors at 50 cents per share, par value one dollar. It will be handled by T. S. Henderson & Co., who have offices in Galveston, Texas, St. Louis, Mo., and Chicago, Ill. This firm publishes a weekly market letter which is interesting and contains much valuable information. The readers of Popular Mechanics, who may be interested in matters of this kind, can secure the market letter mailed free upon application to T. S. Henderson & Co., 613-614 Adams Express Bldg., Chicago, Ill.

FOR GRAIN, DAIRY OR STOCK RANCHES

Fruit and Garden Farms, Timber Lands, and Cheap Lands in Western Oregon and Washington

Address R. H. DUNN,

Real Estate and Financial Agent,

149½ First Street., Portland, Oregon.

Send for a Free Copy of the

"Pacific States Investor"

326 Post Street

San Francisco, California

The Up-to-Date Financial Journal

WHY GO TO "COLLEGE" TO LEARN BOOK-KEEPING WHEN I WILL MAKE A

First-Class Book-Keeper

of you at your own home in six weeks for $3 or return money. Fair enough? I find POSITIONS, too, everywhere, FREE. Have placed thousands. Perhaps can place you, too! 6,630 testimonials received from pupils. SAVE THIS AND WRITE. J. H. GOODWIN, Expert Accountant, Room 849, 1215 Broadway, New York.

TO BUILD PULP PLANT AT KANKAKEE.

The National Fiber and Cellulose Company, which makes paper pulp from corn stalks, as told of in the June 28 issue of Popular Mechanics, is preparing to erect an extensive plant on the Kankakee river at Kankakee, Ill. Between eleven and twelve acres of land with 450 feet river front and on the Belt Lines have been purchased for the purpose. Here are to be erected depithing plants and a large pulp mill. Other depithing plants will be built in the Kankakee district as rapidly as possible to handle this year's corn crop. It is the purpose of the company to have a model plant at Kankakee turning out pulp, feed and cellulose compounds. The company already has offers from abroad for all the feed it can furnish.

Hundreds of people in the suburbs of Boston are being poisoned by a queer kind of caterpillar which infects the shade and fruit trees. When the caterpillar drops on a person it leaves a fuz, which enters the pores of the skin and makes a painful and irritating rash.

Attention, Homeseekers!

Don't you want to locate on a Homestead? Will locate you on one with good soil and timber, and very accessible, at living rates. Also Timber Claims and Farms. Write us.

J. W. ANTRIM, Woodstock, Oregon.

Summer Course in Easy Mechanics For Boys.

By Wilbert S. Drew.

[This series, commenced in issue of June 28, will continue each week. It will give instructions which any boy can understand, how to use carpenter's tools and make things. In doing this only a few tools will be required, and cost of material will be small. The articles to be made will include a boat, table and similar subjects.]

A FOURTEEN-FOOT ROW BOAT.

Chapter I.

This boat, though very simple in construction, rows easy, is not readily capsized and is an excellent boat for hunting and fishing.

The lumber used should be the best quality of well seasoned pine, one inch thick, except for the ends, which should be two inches in thickness.

First cut the sides, which should be twelve inches wide, to the shape shown. See that the grain in these pieces is very straight; otherwise it is liable to split.

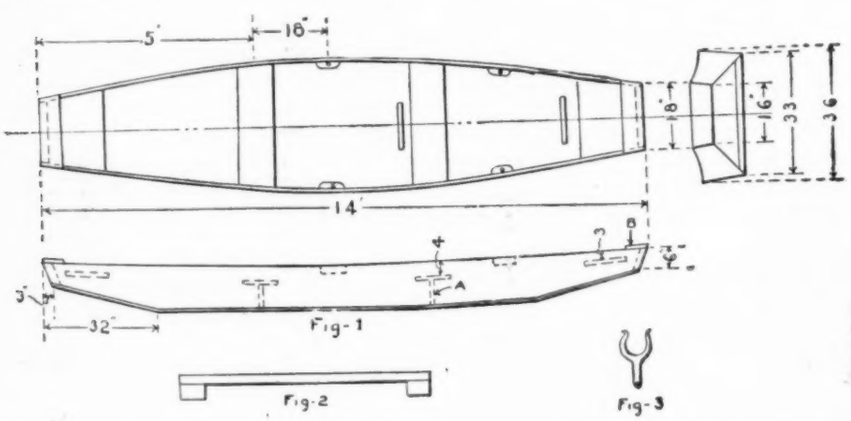


Fig-1

Fig-2

Fig-3

Cut the end pieces to shape, carefully beveling the edges to the required angle with the plane. Get out two pieces, each 7 inches wide and 34 inches long, to serve as braces under the middle seats as shown at A. Saw the ends of these pieces at an angle so that the boat will be three inches wider at the top than it is at the bottom, as shown in the sketch.

Nail the sides to these braces and then make several clamps like Fig. 2, by nailing blocks to each end of a strip of board. Make the distance between blocks on the first two clamps 33 inches, and put them across the boat just under the braces to keep the sides in position while they are being bent. It may also be well to place another pair of clamps just over the braces. Now make two or three more pairs of clamps, having a less distance between the blocks, and put them on so as to draw the sides of the boat together. Wedges may be driven in between the blocks and the sides of the boat to assist in drawing them together. Now cover the ends of the end pieces with a good coating of white lead and nail them firmly in place with stout nails. Do not remove any of the clamps until the two pieces B have been put in place and nailed. Several clamps should be left in position until the bottom boards are secured in place.

Now turn the boat bottom up, being careful not to strain the joints already made, and plane the edges of the side pieces so that when the bottom boards are put on they will rest evenly and touch the side pieces throughout their entire width.

We are now ready to fit and put on the bottom boards which should be about 8 inches wide and free from knots. Take a board and lay it across one end of the boat, just even with the outer edge of the piece and mark with a lead pencil. Saw close to the lines, being careful to get the cut square with the side of the board and nail in place with three nails at each end, first coating the bottom of the side pieces and of the end piece with white lead. If a very durable job is desired brass screws two inches long may be used in place of nails, but these are quite expensive. Nail well into the bottom of the end piece also. Now proceed in the same manner with the other bottom boards until they are all in place. The edges of these bottom boards should be placed close together, but the joints between them need not be very close—1-32 inch space will do no harm. The method of making them water tight will be explained later.

The seats, which may also be eight inches wide, should next be put in place; the two middle seats go just over the braces, A, which support them. A cleat should also be put under each end of the seats and nailed into the side pieces. The end seats should be set in the position shown, just in front of the pieces B and three inches below the top of the boat, with a cleat under each end but as these seats are short no cross brace will be required.

Make four cleats of hard wood, each two inches square and six inches long, for holding the row locks. The ends should have their inner corners rounded off as shown in the sketch. Screw these firmly in the position shown, the screws being put in from the outside of the boat. At least four 2-inch screws will be required, and in order to keep them from twisting off while being screwed into the hard wood, holes must be made for them with a brad awl about as large in diameter as the screw at the bottom of the thread; that is, the bottom of the groove which forms the screw. The screws will go in much easier and with less danger of breaking, if they are coated with soap before screwing them in. Now bore four holes as shown, of such size as to allow the row locks to just slip in.

A common form of row lock, which may be bought of any dealer is shown in Fig. 3. There is a hole in the bottom of the shank, through which a small chain may be passed and fastened to the side of the boat to prevent loss of the row lock, if it accidentally comes out of its socket while in use.

We are now ready to make the joints between the bottom boards water tight. This is done by the process known as caulking. Get some oakum or hemp packing, or failing to find these, take a piece of hemp rope and pick it to pieces. Soak well in linseed oil and drive into the cracks between the boards with a thin broad chisel, which you can get any blacksmith to make for you or an old square ended putty knife will do. Drive in as much hemp as the cracks will hold, doing all the work from the bottom of the boat, which will then be ready to paint. New cotton batting, such as is used to make quilts is also an excellent substance with which to caulk a boat.

(To be continued.)

A new type of steamship which, it is claimed, will save 20 per cent in coal, is being tested at Copenhagen. It is the invention of F. C. Ishoy. The screw is placed under the bottom instead of aft; the hull is flatter than in other vessels and the draft considerably lessened.

ELECTRICAL BARGAINS

Complete N. D. outfit for Learning Telegraphy	$1.75
Pocket Electrical Search Light	1.50
Complete Electric Bell Outfit	.85
2 Complete Electric Telephones, good for lines up to 2,000 feet	7.00
Handsome D. T. Medical Battery, with guide for treating 100 diseases.	3.50

Any of the above sent by express (not prepaid) on receipt of price.

Universal Dating Stamp by mail, prepaid, for 25 cents.

J. H. BUNNELL & CO. Inc.

Established 1879

20 Park Place, New York

N. B.—Send for catalogues, Dept. Y

REORGANIZATION OF THE COSMOPOLITAN LIGHT CO.

The Cosmopolitan Light Co., recently reorganized and capitalized, has moved into the new Cosmopolitan Building, 41-43-45 State street, next to the Masonic Temple. New machinery has been purchased, the factory enlarged, modern scientific methods adopted, and it is said they are more thoroughly equipped than ever to supply trade with the best possible articles at reasonable prices. The reputation of the Cosmopolitan mantles for durability and brilliant illuminating power is established beyond question. The company also make a specialty of indoor and outdoor lighting, carrying in stock one, two, three and four light cluster lamps which are guaranteed to produce a greater light

The Cosmopolitan Mantle.

with less than one-half the cost of the electric arc light. In their gasoline department they manufacture a one light indoor and outdoor vapor lamp which is warranted to produce 750 candle power at a cost of one cent for seven hours. The beautiful, strong, steady, white penetrating light these lamps produce is incomparable. They soon pay for themselves in the saving effected. The Cosmopolitan company make not only the best, but the only really successful hydro-carbon lamps yet discovered. There is no doubt that the Cosmopolitan company have come to stay and Popular Mechanics predicts a great future for them. Their ad. representing "The Cosmopolitan Company Lighting Chicago" appearing elsewhere in this issue is something new and artistic in the line of advertising.

FASTEST ELECTRIC ROAD IN THE WORLD.

The fastest electric road in the world will shortly be put in operation between Chicago and Aurora and Elgin. Special motors have been built to run at 70 miles an hour without heating. The track has been constructed for this speed. The General Electric Co. will soon experiment on this line and try to produce an electric motor that will make 100 miles an hour.

SPECIAL OFFER FOR 25 CENTS

Read Popular Mechanics, the paper that tells you how to do things. It is "Written so you can understand it."

SCIENTIFIC

From all over the world its editors glean the best and most instructive information; boil it down so that the idea is conveyed in the fewest words possible. You do not have to waste your time getting the meat out of an article. Popular Mechanics gets the meat out for you. It affords a history of invention, discovery and progress of this mechanical age. To read it is an education. Our articles are short. The very unusual length of the article on Oregon this week has crowded out several department.

SHOP NOTES

While specially written for mechanics, are valuable to every one. Two pages each week, fully illustrated. This department each week tells easy ways to do hard things.

INVENTORS

Will find each week many valuable suggestions of great assistance in their work.

ELECTRICAL EXPERIMENTS

To anyone interested in learning all about electricity, and wishing to build a telephone, telegraph, motor, etc., our "Easy Electrical Experiments" makes these matters perfectly plain. Hundreds of young men and boys are making these things from our instructions.

SUMMER COURSE IN MECHANICS

Now running tells how to use carpenter's tools and make boats, tables, and other things of practical use. Written by the instructor in wood working in the leading manual training school in the United States.

TO NEW SUBSCRIBERS

Wrap a 25 cent piece in a bit of paper, send it with your name, and get Popular Mechanics 3 months. Money may be sent at our risk. Uncle Sam's boys are honest.
Address:

POPULAR MECHANICS
Journal Building, Chicago

T. S. HENDERSON & CO.

OIL STOCKS AND OIL LANDS

ALSO FISCAL AGENTS FOR

St. Louis & Beaumont Transportation Company

For description see page 427

REFERENCES: Ed. McCarthy & Co., Bankers, Galveston, Texas.
National Bank of Commerce, St. Louis, Mo.
Jeffris Dearborn & Co., Chicago, Ill.
Dunn and Bradstreet Commercial Agencies, St. Louis, Mo.

OFFICES: Galveston, Texas. Chicago, Ill. St. Louis, Mo.

FRED. W. FICKETT, Attorney,
613-614 Adams Express Building,
CHICAGO.

FOR
CORLISS ENGINES
Used--But Little Worn--Write to
W. S. McKINNEY & CO.
1707 Marquette Building, Chicago, Ill.

FOR SALE---MACHINERY

Hoisting engines, pile drivers, steam dredges, steam shovels, locomotives, dump cars, flat cars, relaying rail, engines, boilers, pumps, air compressors, rock drills, channelers, stone crushers, concrete mixers, road rollers, grading and ditching machines, wheel scrapers, traveling derricks, cable ways, wire cable, etc. Send for "Shaw's Booklet" of bargains in machinery.

WILLIS SHAW,
614 New York Life Building, Chicago

POPULAR MECHANICS
PUBLISHED BY POPULAR MECHANICS CO.
Journal Building, . . . Chicago, Ill.

SUBSCRIPTION
United States, Canada, Mexico and all U. S. Possessions, per year - - - - - - $2 00
Make Remittances by Draft, Money Order or Registered Letter.
ADDRESS
POPULAR MECHANICS
Journal Building, - - - - - Chicago

Entered at Chicago Postoffice as Second Class Mail Matter

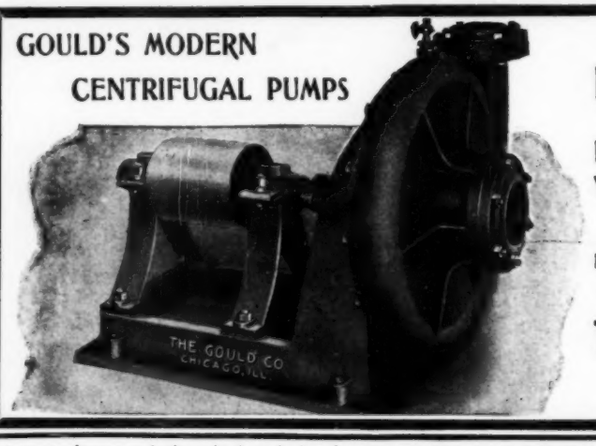
HOW TO MAKE A CHEAP WROUGHT IRON FORGE.

How to make a serviceable wrought iron forge at small expense is described by John L. Lefler in the American Blacksmith. He first bought a blower of a mail-order house in Chicago, which, laid down in Texas, cost him $18.30. He says: "I got an old binder bull wheel, or drive wheel, of the old style with wooden rim and spokes, tore all the cleats off the tire and took out the rim. The rim was 39 inches in diameter, which makes a good large hearth, 3-16 of an inch thick and 8 inches wide. To this I put four 1-inch round iron legs of suitable length, with a nice curve at the bottom. I then made a shoulder 5 inches from the top of each leg for the edge of the tire to rest on. One and 3 inches from the shoulder I drilled two 5-16 inch holes to bolt the legs to the tire. I then bent the remainder of the leg at right angles and drilled another 5-16 inch hole. I used one of the old holes that was in the tire, where the cleats were fastened to bolt the legs on. I then drilled another in the tire to suit the hole in the legs, and bolted them to the tire on the inside. Now, my forge was sitting up on legs, just the right height. I next got two old wagon tires, and cut them long enough to reach across from one leg to the other, bolting to the legs on the under side of the right angle end of the leg, and cutting the pieces to fit snugly to the circle of the forge. (It was no longer to be called an old binder tire, but a wrought-iron forge.) Across these two bars I put two more running the other way, cutting them 6 inches longer, so as to bend down or at right angles 3 inches from each end with a 5-16 inch bolt hole in each end to bolt to circle of forge, making them level with the top of the legs, as the first two were bolted under the angle ends of the legs. I also had them wide enough apart at the center of the forge to make a square just large enough to fit the tuyere iron snugly with the pipe connection under the bars. Now, I put a ¼-inch bolt where these bars cross each other, making the forge perfectly solid. Next I took a pair of tinner's shears and sheet iron. I began cutting out the lining for the forge or the bottom, having filled in on the bars with lighter old tire where it was necessary to keep the sheet iron from swagging. This bottom or lining I cut to fit snugly up to the tuyere iron and the circle of the forge. After the first layer was down I put on a heavy coat of coal tar, then cut the second layer and reversed the pieces, thus, crossing the seam of the first two and pressing them down on the coal tar, then another coat of tar, and then another layer of iron, then tar. Next was the fire pot. A cement was made of clean sand, lime and water. Pouring this in on the tar, and rounding in around the tuyere and fire pit, and leveling it off, the forge is ready for work when the hearth is dry. I still have two inches of iron above the hearth. Next I connect my blower. When this is done I get some good green carriage paint and a brush, wash off all dirt from the new forge, and when dry put on three coats of this paint as fast as it will dry. I then have a complete forge at a cost all told of five or six dollars, which would have cost me eighteen or twenty dollars to have bought it."

TO CLEAN SHOP FLOORS.

In the South Side Elevated Railroad shops of Chicago it has been found that the use of lime aids in cleaning up the shop floors and in keeping them in good condition. This lime is simply swept over the floor every day, in addition to the regular cleaning. Very little remains on the floor after the sweeping, but it is sufficient to conteract the effect of the oil and grease, and to make it easy at the beginning of each day to clean up what has fallen the previous day, as well as to improve the appearance of the floor.

GOULD'S MODERN CENTRIFUGAL PUMPS



For Irrigation
Manufactured in Horizontal, Vertical and Direct Connected Types
Write for Catalogue
The Gould Co.
Chicago, Ill.

What Is Schapirograph?

The Duplicator that cleanly multicopies anything written by pen and typewriter. One original gives 150 copies **Black** ink in 15 minutes. Avoids: stencil, washing, delays, and expensive supplies. Price, complete cap-size outfit, $8.00. Lasts years.
PRACTICAL TRIAL without DEPOSIT cheerfully allowed by
The Popular Schapiro-Graph Co. 265 Broadway, N.Y.

THE "NULITE"

750 Candle Power ARC ILLUMINATORS
Produce the finest artificial light in the world. Superior to electricity or gas, cheaper than

Outdoor Arc

Ins de Arc

kerosene oil. A 20th century revelation in the art of lighting.

They darkness into daylight turn,
And air instead of money burn.

No smoke, no odor, no noise, absolutely safe. They are portable, hang or stand them anywhere.

We also manufacture TABLE LAMPS, WALL LAMPS, PENDANTS, CHANDELIERS, STREET LAMPS, ETC. The best and only really successful Incandescent Vapor Gas Lamps made. They sell at sight. Good agents wanted. Write for catalogue and prices.

Chicago Solar Light Co.
Dept. 50. CHICAGO, ILL.

To Whom It May Concern:

I have opened an office at Rooms 1520-21 Marquette Bldg., 204 Dearborn St., Chicago, for securing Patents, Trade-marks and Copyrights in the United States and Foreign countries.

Having been actively engaged in practice before the Patent Office at Washington, D. C., and the United States Courts since 1881, during which time I have conducted nearly one thousand patent cases, I feel qualified to offer my services to those who are interested in patents as inventors, investors and manufacturers. My office in Washington will be retained in charge of a competent associate, so that clients will have the advantage of direct representation at the Patent Office as well as of personal consultation with their attorney. After patents are obtained, I will assist clients in disposing of their patent rights to the best advantage.

Books on Patents, and references will be furnished upon request

Respectfully,
FREDERICK BENJAMIN,
PATENT ATTORNEY AND SOLICITOR.

Telephone, Cent. 520.

BUSINESS CHANCES.

FOR SALE—5-acre tracts in the heart of Missouri's zinc, lead, fruit, nut and timber lands. $5.00 down secures a 5-acre tract. My circulars explain why these plantation lands will rapidly increase in value and how non-resident investors obtain a steady income from them. Address W. B. Sayler, Carthage, Mo.

200 SHARES Gold Medal Mining Stock: pays good dividends. Price $3 per share; worth $6. I must have money and am willing to sacrifice. Address 432 Popular Mechanics.

FOR SALE—Patent No. 694,388, dated March 4, 1902. Bicycle and motor parasol and rain hood. Something needed by every bicycler. Can be applied to any machine. Address Robert Kaucher, 578 St. Paul Street, Rochester, N. Y.

FOR SALE—U. S. Patent No. 695,793, dated March 18, 1902. Setting instrument A tool every machinist should have. Used for different purposes. Will sell entire patent. For descriptive circulars address Morris Chamberlain, Barley, N. J.

FOR SALE—Planing mill, sash, blind and door factory. In good condition. Plenty of work. Steam and water power. In village of 2,000 population; has canal and railroad. For particulars inquire of C. F. Rice, Boonville, Oneida Co., N. Y.

WANTED—Partner with capital or facilities to manufacture six wood-working machines, four of which are now patented. They have been operated and shown to be practicable and of great utility. Will alone make a good business. A thorough investigation solicited. Henry A. Holt, Wilton, N. H.

WILL LEASE on royalty to responsible parties, new patent on household article. Can be delivered anywhere in country at cost of 1½ cents, including royalty Sells for five cents, and five millions is considered conservative estimate of annual sales.—Address 445 Popular Mechanics.

SPECIAL.

THE BEST BOOK for electricians and beginners in electricity is "How to Make and Use Electricity." Price 10 cents. Address Box 150, St. Paul, Minn.

YOU CAN always buy Popular Mechanics back and current numbers at Horder's News Depot, 149 Washington St. (Cor. La Salle), Chicago.

POSITIONS WANTED.

WANTED—Position to sell machinery. A man with 21 years' experience with machinery wants agency for machinery. Reference given if desired. Address R. M. Royal, Owenville, N. C.

SPANISH born gentleman, 32 years old, graduate of Technical American University, desires position as traveling agent through Latin countries. Acquainted with coffee and sugar machinery and perfect knowledge of Spanish. Address "Spanish" care of "Popular Mechanics".

"Electrical Experiments"

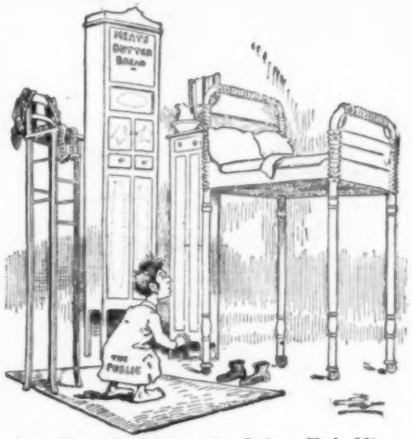
We can supply back numbers containing the popular series

EASY EXPERIMENTS IN ELECTRICITY, By Prof. Dickinson of the Electrical Department of the Armour Institute of Technology, Chicago, giving full and simple directions,

HOW TO MAKE

Simple Galvanometer .....Jan. 18
Box to Hold Battery.....Jan. 25
Tangent Galvanometer .....Feb. 1
Powerful Magnet .....Feb. 8
Induction Coil .....Feb. 15
Simple Electric Motor.....Feb. 22
Electric Circuit of Water.....March 1
Voltmeter .....March 8-15
Storage Battery .....March 22
Simple Telephone .....March 29
Electric Motor 1-20 H. P.....
.....April 5-12-19-26-May 3-10
Set of Telegraphic Instruments.....
.....May 17-24-31-June 7
A Dry Cell Battery.....June 14
Practical Telephone.....June 21-28-July 5

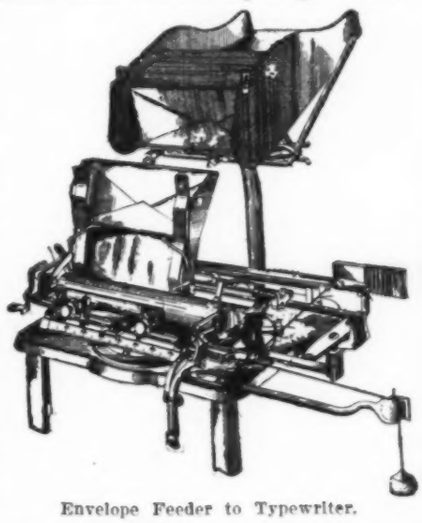
Price 5 cents per copy, postpaid. Order of your newsdealer, or address Popular Mechanics, Journal Bldg., Chicago.



And Now Furniture Is Going Up!—Minneapolis Journal.

FEEDS ENVELOPES TO TYPE WRITER.

E. H. Reynolds of Sterling, Ill., has invented an attachment for type writing machines which contains a package of envelopes. When the letter is finished and the operator is ready to address the envelope, by the movement of a lever one envelope is brought down and fed into the machine.



Envelope Feeder to Typewriter.

Popular Mechanics wants representatives in every town in America. Pleasant work. Good Pay.

Everyone is now interested in

ELECTRICITY

Any desired supplies can be procured from us. To successfully learn Telegraphy use our Eureka Learner's Instrument, Complete with Manual, each $1.60. Telephones, Call Bells, Fans, Motors. Everything Electrical.

Manhattan Electrical Supply Co.

New York. Chicago.

Mention Popular Mechanics

MINING

WANTED to interest parties in a paying shipping mine, with large reserves of excellent concentrating material in sight; ores contain gold, silver, lead, zinc and copper. Average per cent of lead in crude ore, 18 per cent. Milling facilities will be at hand in 60 days. Will stand a rigid examination. Mine and smelter within two miles of mine. Address DAN C. TOBIN, Whitepine, Colo.

Mention Popular Mechanics.

A NEW MONEY MAKER

For Agents. A household necessity. 70,000 sold in Minneapolis. Costs 7c, sells for 25c. Agents making $7.00 per day. Millions will be sold. You show what it will do and it sells itself. People borrow money to buy it. Beats everything as a money maker. Send 10 cents TO-DAY for sample outfit. **Domestic Mfg. Co., Minneapolis, Minn.**

Mention Popular Mechanics.

ORLAN CLYDE CULLEN,
Counsellor-at-Law

U. S. Supreme Court, Registered Attorney U. S. Patent Office, United States and Foreign Patents, Caveats, Trade Marks and Copyrights.

No. 700 7th Street, N.W.

Opp. U.S. Patent Office. WASHINGTON, D. C.

Mention Popular Mechanics

I desire to represent a manufacturer as Selling Agent, Mechanical Line preferred. On commission basis. References exchanged. Correspondence solicited. Address 430 Popular Mechanics.

FOR SALE.

A two-seated Locomobile, in good condition; panel back seats; water glass on tank and other improvements.

Will W. Morrison, Bryan, Ohio

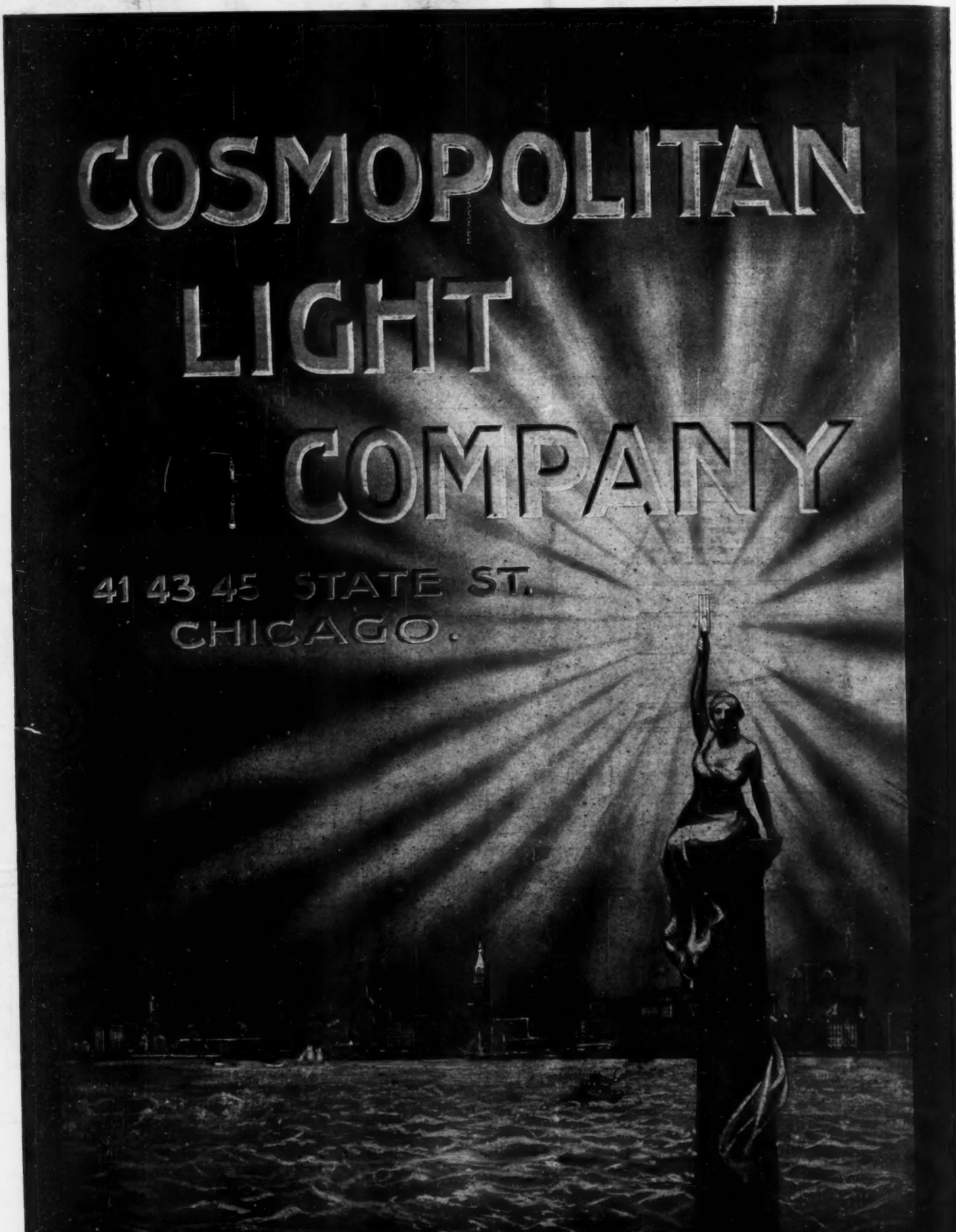
PATENTS

CHAS. SOUTHWORTH HILL

1133 MONADNOCK BLOCK,
CHICAGO.

Telephone Har. 575

11th FLOOR (SOUTH END OF BUILDING) MENTION POPULAR MECHANICS


COSMOPOLITAN
LIGHT
COMPANY
41 43 45 STATE ST.
CHICAGO.